

REMARKS

Claims 21-35 are in pending the present application and stand rejected on various grounds. Reconsideration of the present application in view of the following comments is respectfully requested.

Figures 1B-1D were objected to for lacking a prior art legend. A proposed drawing correction is included as a separate paper herewith that adds the -- Prior Art -- legend to Figures 1B-1D in red for the Examiner's review. It is believed these proposed changes address concerns raised about the figures.

Claims 21-35 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,034,418 to Matsuura (the "Matsuura" reference). The Applicant respectfully traverses. As an initial matter, the Applicant reserves the right to overcome this reference under 37 C.F.R. § 1.131. Even assuming arguendo this reference is properly asserted, several reasons support the novelty of the present invention as explained hereinafter.

In the First Office Action, it is asserted that the reference teaches a "hydrophobic material (SiF)." There is no discussion of "SiF" as a compound, rather Si--F bonds are described in relation to a SiOF film. As described in connection with Matsuura's Figure 8, an SiOF film can permit easy infiltration of moisture, which prevents it from serving as a hydrophobic layer (see column 1, lines 27-57). In contrast, the present application teaches the substitution of surface OH groups with Fluorine (F) to provide a hydrophobic layer, which differs from Matsuura's arrangement in figure 8. See, for example, page 10, lines 16-21 of the present application.

While only referring to claims 22-25, and 28-35, it seems that the Office Action is asserting that the layer of SOG material recited in claim 21 is disclosed in the Matsuura reference because it is a "product by process limitation" subject to the law of "product by process claims." The cited cases seem to uniformly refer to products defined by gerund-based method claims (i.e., the "process") not merely selected limitations. Accordingly, it is respectfully submitted that, while these cases might apply to product by process claims, they are inapplicable to the apparatus claims of the present application.

Moreover, the acronym "SOG" (as derived from "spin-on-glass") is understood by those of ordinary skill in the art to refer to a class of dielectric compositions with a relatively low dielectric constant as explained, for example, on pages 1 and 2 of the present application. As such, this term does not merely refer to a process to form a product. Indeed, U.S. Patent No. 6,144,097 to Asahina et al. (the "Asahina" reference) is an example of how this term is commonly used in the art to refer to a composition with understood properties. Thus, it is respectfully submitted that it is improper to regard SOG material as a "product by process limitation" to the extent "product by process claim" law would even apply. Accordingly, multiple grounds serve to distinguish independent claim 21 from the Matsuura reference. For at least the reasons explained in connection with the SOG material of claim 21, the spin-on-glass material and hydrophobic material layer features of the other independent claims are among those not taught, suggested, or disclosed by the Matsuura reference. Further, the rejected dependent claims are patentable for at least the reasons given in support of the patentability of the corresponding independent claims.

Claims 21-23, 25-29 and 31-35 were also rejected under 35 U.S.C. § 102(e) as being anticipated by the Asahina reference. As in the case of the Matsuura reference, the Applicant respectfully reserves the right to overcome this reference under 37 C.F.R. § 1.131. Somewhat inconsistent with the rejection under the Matsuura reference, this rejection does not appear to treat any of the limitations as being subject to "product by process claim" interpretation.

Assuming arguendo that the Asahina reference is properly applied, it appears to rely on text in column 5 as teaching a layer of SOG material 30, having a via hole 32, with reference to Fig. 1B, which is reproduced in relevant part as follows:

Next, as an interlayer dielectric, there is formed a Boron-Phospho-Silicate Glass (BPSG) layer 30 having a thickness of approximately hundreds nm to 1 um on the silicon oxide layer 20, by a vapor-phase reaction of a silane compound such as SiH_4 or TEOS, and gases containing oxygen, ozone, phosphorus, and boron. Then, the wafer is annealed in a nitrogen atmosphere at a temperature of 800 to 900° C. to be flattened by a high temperature flow. Flattening may be performed by utilizing a commonly-used Spin-On-Glass (SOG) layer, instead of the high temperature flow of the BPSG layer 30.

As careful consideration of this passage reveals, spin-on-glass (SOG) is used to flatten the wafer instead of a high temperature flow of the BPSG layer 30 — there is no teaching that SOG is used as a substitute for the BPSG layer 30. [Indeed, such a process involving SOG is not illustrated or further described anywhere in the reference. At best, it appears the reference discloses adding SOG to layer 30 to increase wafer flatness instead of heating — whether it is retained or otherwise used to form some type of via hole is not disclosed.]

The Office Action refers to column 5, lines 10+ to assert that a via hole with a wall surface is disclosed that inherently has a hydrophobic material layer SiF due to the etching process with NH_4F . Even assuming arguendo that the formation of some type of hydrophobic layer is inherent, the cited portion of the reference refers to processing in the fabrication of an electronic element before the BPSG layer 30 and/or any SOG layer is even present.

Furthermore, it is respectfully submitted that formation of a hydrophobic material layer is not inherent to the use of an aqueous solution containing NH_4F and hydrogen fluoride (HF). For an element to be inherently disclosed, it must "necessarily be present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill." *In re Robertson*, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999) (citing *Continental Can Co. v. Monsanto Co.*, 948 F2d 1264, 1268 (Fed. Cir. 1991)). Indeed, inherency "may not be established by probabilities or possibilities . . . The mere fact that a certain thing may result from a given set of circumstances is not sufficient." 49 USPQ2d at 1951. "In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." *Ex parte Levy*, 17 USPQ2d 1461, 464 (USPTO Bd. of Pat. App. and Interferences 1990) (emphasis in the original). See also Manual of Patent Examining Procedure (MPEP) § 2112.

It seems highly unlikely that a hydrophobic material layer would form when exposed to an aqueous solution (that is one containing water) of the type described in column 5 -- let alone that it is a necessity of such disclosure. The absence of inherency is even more emphasized by the fact that the interlayer dielectric through which via holes are made does not exist when such material is used in the Asahina reference, and that subsequent chemical and thermal processing

steps are used before this dielectric is formed. For at least these reasons, it is believed the rejected claims are novel.

Dependent claims 24 and 30 were rejected under 35 U.S.C. § 103 as being unpatentable over the Asahina reference in view of U.S. Patent Number 5,557,147 to Sugiura et al. (the "Sugiura" reference). In rejecting these claims, the Sugiura reference is relied upon to teach CCl_4 , interchanging it with the NH_4F etchant of the Asahina reference. These claims are patentable for at least the reasons given in support of the dependent claims. Moreover, formation of a hydrophobic material layer does not necessarily flow from this combination of references either. Accordingly, it is believed these dependent claims are also patentable.

In view of the foregoing, it is believed that claims 21-35 are in condition for allowance. Reconsideration of the present application is respectfully requested.

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Respectfully submitted:

SEP 17 2002




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The Commissioner is authorized to provide any further extensions of time and charge any deficiency or credit any overpayment to Deposit Account No. 23-3030, but not to include issue fees.

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Extension of Time
Application No. 09/715,973
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